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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,766	10/05/2001	Yasushi Yamazaki	110791	1937

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EXAMINER

HU, SHOUXIANG

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/970,766

Applicant(s)

YAMAZAKI ET AL.

Examiner

Shouxiang Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,9 and 17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3,9 and 17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 07 July 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruel ("Bruel'835"; 5,494,835) in view of Bruel ("Bruel'564"; 5,374,564; of record) and/or JP'114 (JP 4-25114, 1/28/1992).

Bruel'835 discloses a method of manufacturing a semiconductor substrate (See Figs. 1-4), comprising the processes of: forming an ion shield member having a predetermined shape on a semiconductor substrate (1; also see col. 4, lines 3-9); implanting ions into the semiconductor substrate main body to thereby form an ion implantation layer (4 and 7); removing the ion shield member (inherently included, as evidenced in Fig. 3, where no ion shield member remains between the two substrates (1 and 11); laminating the semiconductor substrate (1) and a support substrate (11) onto each other; and separating the semiconductor substrate main body from the support substrate at the ion implantation layer.

It is noted that the ion shield member in the embodiment of Figs. 1-4 in Bruel'835 is formed of a resin mask obtained by photolithography (see col. 4, lines 3-7). Although Bruel'835 does not explicitly disclose that the resin mask is formed on the substrate,

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one of ordinary skill in the art would readily recognize that such a photolithographed ion-implantation mask is normally commonly formed on the substrate into which ions are to be implanted (as evidenced in the prior art references such as Kishimura (US 5,591,654; see the ion-implantation mask (8) formed of a resin resist in Fig. 1F)).

Although Bruel'835 does not expressly disclose that the method can further include a step of forming an insulation film on the semiconductor substrate, one of ordinary skill in the art would readily recognize that an insulation film can be desirably formed on the semiconductor substrate for improving the quality of the laminated interface, as evidenced in Brue'564 (see col. 2, lines 61, through col. 3, lines 9).

In addition, although Bruel'835 does not expressly disclose that the sidewalls of the resist used for the ion shield member can be tapered, it is art-recognized that the wall angle of the sidewalls of a patterned resist normally naturally has a distribution around a targeted value, as evidenced in JP'114 (see the wall angle in Fig. 2). It means that the wall angles of the regular resist patterns always naturally include some tapered ones.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporating the step of forming an insulation film of Bruel' 564 along with a common resist patterning method such as the one of JP'114 into the method of Bruel'835 for making a semiconductor substrate, so that a semiconductor substrate with improved quality in its laminated interface would be obtained with a common resist patterning method. And, with such a collectively taught method, the sidewalls of the ion shield member would always naturally include some tapered ones.

Regarding claim 2, it is noted that the kind of separation in Bruel'835 always tends to occur at a peak position of the ion concentration in the ion implantation layer (see Fig. 4)

Regarding claim 3, Bruel'835 further discloses that the ion shield member can be formed of a resin mask obtained by photolithography (col. 4, lines 3-6), which can be regarded as a resist layer.

3. Claim 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruel'835 in view of Bruel'564 and/or JP'114, as applied to claims 1-3 above, and further in view of Fukunaga (6,271,101).

The disclosures of Bruel'835, Bruel'564 and JP'114 are discussed as applied to claims 1-3.

Although Bruel'835, Bruel'564 and JP'114 do not expressly disclose that the support substrate can include a thermally conductive film, one of ordinary skill in the art would readily recognize that a thermally conductive film can desirably protect the substrate from thermal deterioration, as evidenced in Fukunaga (see col. 4, lines 36-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporating the thermal conductive film of Fukunaga into the semiconductor substrate collectively taught by Bruel'835, Bruel'564 and JP'114, so that a semiconductor substrate with improved thermal stability would be obtained.

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4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruel'835 in view of Bruel'564 and/or JP'195 (JP 5-313195, 11/26/1993).

The disclosures of Bruel'835 and Bruel'564 are discussed as applied to claims 1-3 above.

Bruel'835 does not expressly disclose that the separated semiconductor substrate main body can have a drive portion thicker than an image display region. However, JP'195 (Fig. 1; also its English abstract) teaches that it is desirable to form a drive portion (the left portion) thicker than an image display region (the right portion) for reducing leaking current in the image portion and the power consumption of the driver portion.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to incorporating the step of forming an insulation film of Bruel' 564 into the method of Bruel'835 with the driver circuit portion being thicker than the image display region, as taught in JP'195, so that an electro-optical apparatus having a semiconductor substrate with improved quality in its laminated interface and with reduced leaking current in the image portion and reduced power consumption of the driver portion would be obtained.

Response to Arguments

5. Applicant's arguments with respect to claims 1-4 and 9 have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is (703) 306-5729. The examiner can normally be reached on Monday through Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SH
September 19, 2003



SHOUXIANG HU
PRIMARY EXAMINER